UNIVERSITI TEKNOLOGI MARA

DETECTION OF LYCOPENE IN LOCAL WATERMELON *(Citrullus Lanatus (thunb.) Matsum. And Nakai)* BY USING HIGH PERFORMANCE LIQUID CHROMATOGRAPHY (HPLC)

BY

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DECLARATION

I hereby declare that this thesis is my original work and has not been submitted previously currently for any other degree at UiTM or any other institutions.

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ABSTRACT

DETECTION OF LYCOPENE IN LOCAL WATERMELON (*CITRULLUS LANATUS* [THUNB.] *MATSUM* AND *NAKAI)* BY USING HIGH PERFORMANCE LIQUID CHROMATOGRAPHY (HPLC)

Malaysia has many types of local fruits that contain high antioxidant activity that distributed as seasonal fruits or non-seasonal fruits. Watermelon is one of non seasonal fruits in Malaysia. Major carotenoid present in red-fleshed watermelon is lycopene. There are limited studies on detection and quantification of phytocemical and antioxidant activities in local watermelon *Citrullus lanatus* [Thunb] *Matsum* and *Nakai* compared with many fruits and vegetables but the aim of in this study are to identify of lycopene in local watermelon by using high performance liquid chromatography (HPLC) with diode-array detector (DAD) and to choose the best method for mobile phase that provide good separation for detection of lycopene by using high performance liquid chromatography (HPLC). HPLC was chosen as an analytical instrument to identify lycopene in local watermelon. Hexane extraction from watermelon juice was used for sample preparation before the sample was run on HPLC analysis. There were two methods of mobile phase was used to detect lycopene in this method. The methods for choosing mobile phase of HPLC were isocratic and gradient methods. Acetonitrile was chosen in isocratic method following from confirmation of TLC. Meanwhile acetonitrile and ionized water were chosen as mobile phase in gradient method. Result of identification of lycopene was compared between two methods of mobile phase, which show the highest peak for both lycopene standard and sample. In conclusion, gradient method was considered as best method for identification of lycopene in local watermelon *Citrullus lanatus* [Thunb] *Matsum* and *Nakai* which used binary mobile phase of acetonitrile and ionized water that peak show retention time 15.53 minutes.

Keywords: *Citrullus lanatus* [Thunb] *Matsum* and *Nakai,* lycopene, HPLC, mobile phase, retention time

CHAPTER 1

INTRODUCTION

1.1 Background of the study

Malaysia has many types of local fruits that contain high antioxidant activity. The types of fruits are either seasonal fruits or non-seasonal fruits. Watermelon is one of non seasonal fruits in Malaysia (Faraniza *et al.*, 2013). Watermelon (*Citrullus lanàtus*) fruits are family of *Cucurbitaceae* (Naz *et al.*, 2014). Watermelon is thought to have begun in Southern Africa that it is discovered wild development all through the land and achieves greatest differing qualities of structures there. It has been developed in Africa for more 4,000 years. Then watermelon became very famous crop when it was brought to America by Spanish (Erhirhie & Ekene, 2013).

Recently more attention regarding the importance of nutritional quality of fruits among people because there are many promotion and advertising of healthy life-style by the health agencies (Zainudin *et al.*,2014). Dietary guidelines worldwide has been recommend among public to increase the consumption of fruit which rich in phytonutrients that can avoid a lot of disorders and diseases (Nile & Park, 2014). According to (Lv *et al.*, 2015), watermelon (*Citrullus lanatus*) is the third most popular fruit vegetable in the world. Major carotenoid present in red-fleshed watermelon is lycopene and different flesh colour in watermelon will show other major carotenoids. In this journal also stated that there are small amount of violaxanthin, phytoene, phytofluene, a-carotene, lutein, zeaxanthin, and beta-carotene in red-fleshed cultivar.

Lycopene, ascorbic acid (AsA), dehydroascorbic acid (DHA), flavonoids and other phenolics are the natural compounds present in watermelon that manage to decrease the risk of cardiovascular diseases, age- related degenerative pathologies and some type of cancers. Major carotenoid which is about 70-90% is lycopene that